wet, proposed from time to time by different authorities, are here discussed, and indicate how much more scientific most metallurgical processes are becoming.

The last part of the book deals with the highly important subject of desilverisation, and is written in no way inferior to the preceding pages. Altogether the author has succeeded in producing a trustworthy and fairly comprehensive treatise on the metallurgy of lead, and we trust his enterprise may be rewarded by a deservedly large sale.

OUR BOOK SHELF.

Zur Stereochemie des fünfwertigen Stickstoffes mit besonderer Berücksichtigung des asymmetrichen Stickstoffes in der aromatischen Reihe. By Edgar Wedekind. Pp. 126. (Leipzig: Veit, 1899.)

ALTHOUGH nearly fifty years have passed since Hofmann succeeded in preparing methylethylamylphenylammonium chloride—a compound in which the nitrogen atom is directly united with five different groups or atoms—very little progress has been made with the study of the stereochemistry of pentavalent nitrogen. It is true, no doubt, that the first and the most important step in advance was made nearly nine years ago by Le Bel, who succeeded in preparing an optically active liquid from a solution of methylethylpropylisobutylammonium chloride, but until quite recently, when Pope accomplished the resolution into its optically active isomerides of Wedekind's benzylphenylallylmethylammonium iodide, Le Bel's work afforded the only evidence which we had of optical activity due to pentavalent nitrogen. The number of known compounds which contain such an asymmetric nitrogen atom, and which might possibly be resolved into optically active components, was also comparatively limited.

In these circumstances it might seem a little premature to write a book on the stereochemistry of pentavalent nitrogen, since the facts to be dealt with are few in number, and the theories which have been advanced to explain them—although nearly as numerous as the facts themselves—still require a groundwork of experimental confirmation.

This difficulty of the lack of material no doubt forced itself upon the author, whose book is not merely an historical review of our present knowledge of the stereochemistry of pentavalent nitrogen; this portion of his subject is, in fact, disposed of within the limits of the first seventeen pages, and by far the largest part (ninety-five pages) of the book consists of an account of the work which the author himself has published during the current year in the *Berichte;* the remaining thirteen pages are devoted to a discussion of the theoretical conclusions to be drawn from the results of his experiments.

As the discussion or criticism of the author's investigations—interesting and important though they are—is a task which does not lie within the scope of this review, little remains to be said except that the whole book is written in much the same way as if it were a paper intended for publication in Liebig's *Annalen;* consequently it contains a great many experimental details, including even the results of many analyses, and this rather detracts from its value as a literary effort. Those, however, who take a particular interest in the stereochemistry of pentavalent nitrogen will certainly welcome the book, and principally on account of its historical survey and theoretical conclusions, for here they will find the scattered literature of the subject conveniently collected and discussed in the light of the author's own important observations. F. S. K.

Handbook of Metallurgy. By Dr. Carl Schnabel. Translated by Henry Louis. Two vols. Vol. i. Pp. xvi+871; Vol. ii. Pp. xiv+732; 927 Figures in the text. (London: Macmillan and Co., Ltd. 1898.)

BERGRATH DR. CARL SCHNABEL is professor of metallurgy and chemical technology at the Royal Academy of Mines at Clausthal, and his work has long enjoyed a well-deserved reputation. Prof. Henry Louis, who translates it, points out that it is a curious fact that there does not exist in the English language a single complete treatise on metallurgy. Dr. Percy's treatises remain only splendid fragments. Dr. C. Schnabel's object has been to give a complete account of the metallurgical treatment of all the metals ordinarily employed, together with all the recent improvements in the art. The two volumes before us are, however, incomplete, as neither they nor the original work deal with the vast section of metallurgy which includes iron and steel.

Prof. Louis modestly says that his chief object has been to present a faithful interpretation of the original. In this he has admirably succeeded. With the full consent of Dr. Schnabel, the translator has introduced brief rules of any new processes, or improvements on old ones, that have been brought out since the German original was produced. It is a pity, therefore, that the additions made by Prof. Louis are not distinguishable from the rest of the text. In a compressed work of this kind space is, of course, valuable; but it appears to have been in more than one case unequally allotted. The Augustin process, for instance, is now but little used, and is, in fact, nearly obsolete, but it has ten pages devoted to it, while the cyanide process for the extraction of gold from "tailings," which is now the most important wet process in the whole range of metallurgy, has only thirteen pages. The wet process for extracting copper, which does admit of brief statement, has no less than forty-nine pages. Many of the illustrations, from their freshness and originality, will be a great boon to students. In a second edition it would be well to devote more care to the illustrations; at present, though they give a good general idea of the processes or machines they illustrate, they are seldom drawn to scale. The writer of this notice has found general diagrammatic schemes of processes to be of great value to students, and some might well have been introduced into the present work. The sections devoted to the metallurgy of zinc and of aluminium may be mentioned as, considering the size of the volume, being singularly complete and conscientious. Viewed as a whole, the book is very accurate and trustworthy, and in welcoming this addition to metallurgical literature Prof. Louis is to be congratulated on the translation.

W. C. ROBERTS-AUSTEN.

La Philosophie Naturelle. By Dr. W. Nicati. Pp. xi+308. (Paris: Giard and Brière, 1900.)

DR. NICATI has, it seems, published books on medicine, on physiology proper, and on psychology. A sense of incompleteness has led him at last to make a raid upon philosophy.

An uncompromisingly positive mind, which does its own thinking *en amateur*, is rarely uninteresting. And Dr. Nicati has ideas upon Rabelais and Zola, upon art and politics in general, on immortality and evolution, on the ultimate formulæ for matter and life. His art-criticisms and his political discourses with a socialist leaning are often readable and sometimes suggestive. A reduction of the idea of responsibility to causation does not lack ingenuity. Unfortunately, any further worth in the book it is impossible to discover, save as it reveals the writer's very abnormal psychosis. "Architectonic" faculty united with incoherence, naivety mostly

seen in etymologies, but also in bizarre analogies as of existence to a tricycle, are salient faults of the book. But Dr. Nicati's obsession by what may be called the fallacy of the graphic formula is its dominant characteristic. In the logical calculus "it is atrociously done," has its adverb expressed by the radical sign; the anti-Dreyfusard admits fluxional considerations. In *l'energétique*, life is formulated by Cae decorated with arrows, because it arises in the decomposition of matter which has cohesion and other qualities. Pictures on p. 250 are quite exciting.

This sort of inanity throughout makes the writer's charge upon Kant, that he lacks logic in speaking of "empty space," and his attack upon evolution, with a view to substitute "a theory simply evolutionarist," quite devoid of weight. The index is quite excellent.

H. W. B.

Kleiner Leitfaden der Practischen Physik. Dr. F. Kohlrausch. Pp. xix + 260. (Leipzig: Teubner, 1900.)

EVERY physicist is familiar with Dr. Kohlrausch's "Text-book of Physical Measurements," either in the original or in its English translation. It is not too much to say that it was the foundation of the numerous text-books of practical physics which have since appeared. Owing to the successive additions that have been made, Dr. Kohlrausch feels that it has lost its original character, and now fails to be suitable, as formerly, to the needs of a beginner. This feeling has induced him to prepare the present "Kleiner Leitfaden" by selecting from and otherwise modifying the larger volume.

In what sense can this new volume be regarded as a book for beginners? One of the most difficult questions for a teacher to solve is: How far ought a student be left to work out his own salvation? No answer can be given which would be applicable to all students. A youth of keen intelligence only requires outline directions: the details he learns best by finding them out for himself. But such men are exceptions in any laboratory. The more ordinary student will miss a point unless it is explicitly brought before his notice. We think it is to the former class that this book will be most useful. Dr. Kohlrausch has certainly not erred on the side of superabundance of instruction. We think, for example, that it might be found better fitted as a general laboratory manual if a larger number of fully worked out numerical examples were supplied. But as for ourselves, we have only admiration for the dignified restraint which is everywhere displayed. This is no cram-book intended to meet the temporary requirements of an examining board; but it is what the author has aimed to make it—an aid to general culture.

Further, the volume is well and accurately printed. We have read it through, and only detect one small error. The G Fraunhofer line is, in the diagram on p. 133, apparently identified with the third line in the hydrogen spectrum; the difference between them would only be about a millimetre in the diagram; but it is a difference which ought to be exaggerated rather than diminished, in order to prevent a student running away with a wrong idea.

A. W. P.

Elementary Algebra. By C. H. French and G. Osborn. Pp. vii + 349. (London: J. and A. Churchill, 1899.)

THIS book has been purposely written to help elementary students who have to do much of their study privately, and with this aim in view the authors have avoided as far as possible all technical terms in the explanation of the various theorems. It is possible that there may be a tendency to leave too little for the student to think out for himself by this procedure, but that is matter for individual opinion. Apart from this, the treatise is excellent in its numerous selections of examples and for the clear arrangement of the various sections.

Magnetism and Electricity for Beginners. By H. E. Hadley. Pp. viii + 327. (London: Macmillan and Co., Ltd., 1899.)

THIS little manual is written specially to meet the requirements of students preparing for the annual examination of the Science and Art Department, and consequently it follows to a considerable extent the lines of the syllabus provided. In many details, however, it very ably satisfies the desirability of providing fuller treatment, while a conspicuous and commendable feature is the insertion of many original diagrams and photographs of actual experimental apparatus.

The general arrangement is to give certain facts or definitions, followed by one or more experiments to be performed for their complete verification, so that in this respect the book may serve very well as an introduction to the electrical side of practical physics.

The apparatus described is almost entirely simple enough for the average reader to make readily, and the very generous number of illustrations (197) will be very helpful to the clear understanding of the statements made.

Part i., on magnetism, occupies 103 pages, and all the chief phenomena are illustrated by facsimile reproductions of the fields of force as shown by iron filings or small magnetometers. The explanation of electrical screening is very simply and clearly stated; in fact, the text is brought up to date as far as is possible in an elementary manual.

Part ii., statical electricity (106 pages), is specially noticeable for the way in which the usual difficulty of dealing with potential is met by geometrical interpretations; potential-diagrams being given for fields of force, electroscopes, condensers, electrical machines and contact electricity.

Part iii., voltaic electricity (93 pages), is somewhat terse in style, probably necessarily owing to the number of matters in this part of the subject which need description, but the fundamental points in all the sections are well brought forward. The book is certainly an excellent one for elementary students, and is also likely to form a sound basis on which a teacher may frame his course of lessons.

LETTERS TO THE EDITOR.

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of* NATURE. *No notice is taken of anonymous communications.*]

Racial Aspect of Voluntary Enlistment.

THERE is one aspect of our voluntary enlistment system which has never been touched upon so far as I know. It is that by our method the most brave and warlike men of each generation are exposed to far more than the ordinary risks of life, and generally at an age when they have left no descendants. A process of selection has, therefore, been going on in the nation for centuries by which, in the long run, the non-fighters, such as commercial classes, luxurious people, and any cowards, have more descendants proportionally than the brave and warlike. So that the average opinion is growing more and more unwarlike, less brave, and more inclined for peace at any price. The above selection is brought home to us if we consider that of those soldiers killed during the last few weeks how few have left two descendants. I foresee two remedies for this state of things, but will not ask for any more of your valuable space.

R. C. T. EVANS.

9 Heathcote Street, Gray's Inn Road, W.C.

The Wind during Eclipses of the Sun.

I WOULD like to draw attention to the importance of observations of the wind in and near the path of a total eclipse of the sun.

At the Indian eclipse of 1898 I employed at Sahdol, in